July 7, 1953 J. M. DORTON 2,644,509

FLOATING MOTION CUSHION FOR VEHICLES AND FURNITURE

Filed March 13, 1945

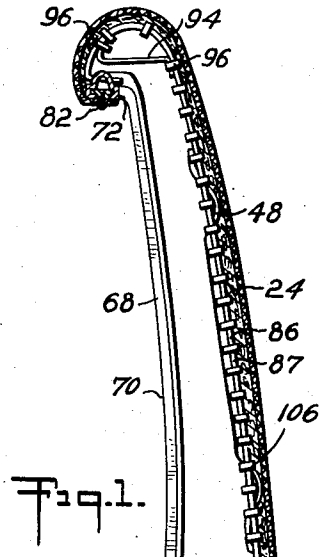


Fig. 1.

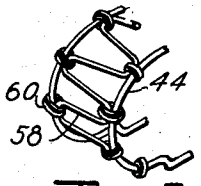


Fig. 3.

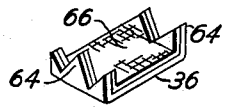


Fig. 4.

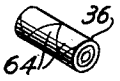


Fig. 5.

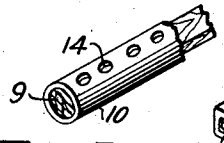


Fig. 6.

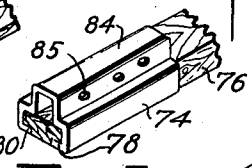


Fig. 7.

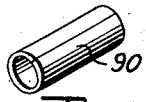
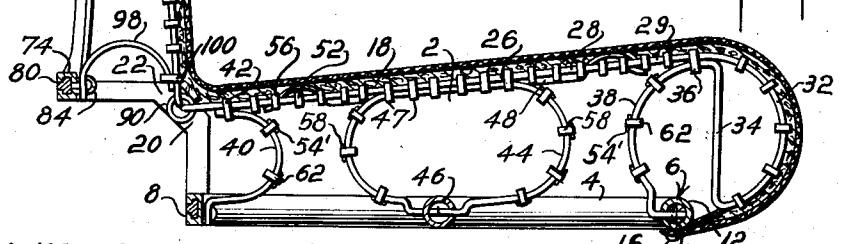


Fig. 8.



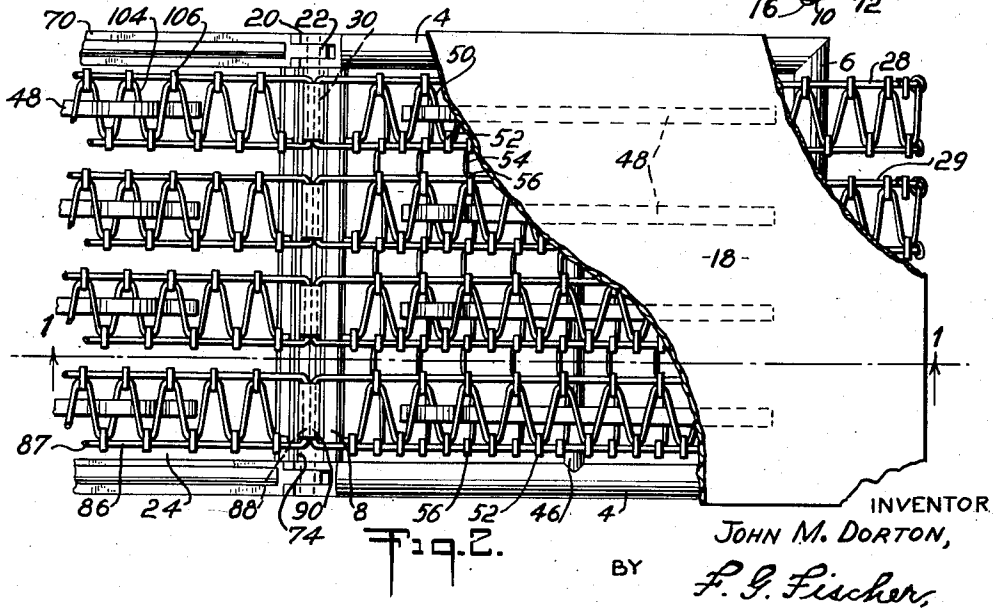


Fig. 2.

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FLOATING MOTION CUSHION FOR VEHICLES AND FURNITURE

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4 Claims. (Cl. 155—181)

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My invention relates to seats, and more particularly to railway car seats, airplane seats, automotive or other vehicle seats, or to furniture seats.

One object of the invention is to provide comfortable seat and reclining back structures consisting largely of wire construction to obtain compact structures of light-weight and maximum strength.

Another object is to provide a back structure of hollow formation open at the rear to provide knee room, so that a greater number of seats may be arranged in one or more rows in a vehicle of given size without discomfort to the passengers.

A further object is to combine a seat structure and a back structure including a number of co-acting structural features to effect a floating support, whereby the seat and back structures may compensate for and accommodate themselves to movements of the occupant and the vehicle.

Other features will hereinafter appear and in order that the invention may be fully understood reference will now be had to the accompanying drawings, in which:

Fig. 1 is a vertical sectional view of the combined seat and back structures taken on line 1—1 of Fig. 2, the back structure being in raised position in Fig. 1 and lowered in Fig. 2.

Fig. 2 is a top plan view of the seat and back structures, respectively, with portions of the latter broken away and most of the upholstery removed therefrom.

Fig. 3 is a fragmentary perspective view of one end of a bridge structure for reinforcing the seat structure.

Fig. 4 is a detail perspective view of a clip in extended position ready for use.

Fig. 5 is a detail perspective view of the clip disclosed by Fig. 4, which is rolled approximately into cylindrical form when being installed in the seat or back structure.

Figs. 6 and 7 are fragmentary perspective views of portions of the seat and back frames, respectively.

Fig. 8 is a detail perspective view of one of a plurality of hinge members employed in operably connecting certain parts of the seat and back structures, respectively.

Referring more particularly to the structures disclosed by Figs. 1 to 8, inclusive, 2 in general designates the seat structure which has a lower frame comprising two side members 4—4, and transverse front and rear members 6 and 8 uniting the ends of the side members 4—4, respectively. Each member of the seat frame is of composite construction, Figs. 1 and 6, including

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a wooden or other tacking core 9 incased in a metallic sheath 10, having a series of spaced apertures 14 through which tacks 16 may be driven into said tacking core 9, to secure upholstery 18 thereto. The rear portions of the respective side members 4 are turned upward and terminate in hinge members 20 which are operably connected to hinge members 22 on the lower forwardly bent portions of the back structure 24, so that the latter may be swung forward to a folded position upon the seat structure 2, or backward to a reclining position. The back structure 24 may be supported in raised or inclined position, or at any point therebetween by any suitable means such, for example, as the means best disclosed by Fig. 2 of my Patent No. 2,430,604, issued November 11, 1947.

The frame of the seat structure 2 is surmounted by a superstructure 26 of wire construction to obtain ample strength with a minimum of weight. As shown by Figs. 1 and 2, the upper portion of the superstructure 26 includes a plurality of longitudinal strands 28 which extend the full length of the seat. Each strand is bent transversely midway between its ends and then bent forwardly to provide a pair of parallel strands 29. The transverse portion forms a hinge member 30 for a purpose which will hereinafter appear. The parallel strands 29 extend forwardly beyond the front frame member 6 of the seat structure 2 and are bent downwardly into approximately semi-circular form, as indicated at 32, then bent upwardly as indicated at 34, Fig. 1, then rearwardly beneath the straight portions of the respective strands 29, to which they are firmly secured by clips 36 which are bent by a special tool, not shown, from the extended position, Fig. 4, to the substantially cylindrical form disclosed by Fig. 5.

The curved front portions 32 of the strands provide a comfortable support for the knees of the occupant of the seat, while the upwardly bent portions 34 cooperate with the curved portions 32 in supporting the forward portion of the superstructure 26. The upwardly bent portion 34 of each strand 29 is assisted in sustaining the front portion of the superstructure 26 by a rearwardly curved resilient reinforcing member 38, the lower end of which is fixed in the front frame member 6, while its upper end is secured to the respective strand 29 by the clip 36. The rear portions of the strands 29 are yieldably supported by forwardly curved resilient members 40 secured at their lower ends to the rear frame member 8 of the seat structure 2, and secured at their upper ends to the strands 29 by clips 42, respectively.

The intermediate portion of each strand 29 is yieldably supported by a resilient member 44 of wire construction bent approximately into elliptical form. The lower ends of each resilient member 44 are fixed in a transverse brace 46, and their upper portions are fixed to the respective strands 29 by means of clips 47. Spring elements 48 cooperate with the respective resilient members 44 in yieldably supporting the intermediate portions of the associated strands 29. Each resilient element 48 consists preferably of a strip of resilient sheet metal, the ends of which are interlaced with a wire 50 bent in zigzag form extending approximately the full length of the associated parallel strands 29.

A zigzag wire 50 is arranged between the strands 29 of each pair and secured at its bent lateral portions to the associated strands by means of clips 52. Each zigzag wire 50 reinforces the associated pair of strands 29 and assists in retaining the latter in parallelism. The zigzag wires 50, however, permit the strands 29 to move longitudinally to a limited extent, so that the superstructure 26 may move forward and backward with a floating like motion. The zigzag wires 50 are assisted in preventing the pairs of parallel strands 29 from spreading apart by transverse wires 54 which extend approximately the full width of the superstructure 26 and are secured to the strands 29 by means of clips 56. The curved ends of each resilient member 44, like the parallel strands 29, are reinforced by wires 58, bent into zigzag form and secured at their bent lateral portions to the bridges by clips 60. The curved portions 38 and 40 at the front and rear ends, respectively, of the superstructure 26 may be likewise reinforced with zigzag wires 54', to which they are secured by clips 62.

The clips 36, 42, 47, 52, 56, 60, and 62 are preferably like the clip disclosed by Figs. 4 and 5. As shown by Fig. 4, both ends of the clip are bent at right angles to the main body portion into V-shaped lugs 64 adapted to interlock as shown by Fig. 5, when the clip is bent into cylindrical form while being applied to the associated wires. The clips are rendered noiseless by fabric or other suitable lining 66, to eliminate squeaks and other noises in the event one or more clips should become loose and scrape against the associated wires.

As disclosed by Figs. 1 and 2, the back structure 24 is somewhat similar in construction to the seat structure 2 and comprises a hollow rectangular frame 68, including side members 70 united by upper and lower end members 72 and 74, respectively. The side and end members 70, 72 and 74 are approximately of rectangular cross section as shown by Figs. 1 and 7 and comprise tacking strips 76 encased in metal sheaths 78, the longitudinal margins 80 of which are spaced apart to permit tacks 82 to be driven into the respective tacking strips for the purpose of holding the upholstery 18 in place. One side of each sheath 78 has a longitudinal bead 84 with perforations 85, for a purpose which will presently appear.

The front portion of the back structure 24 includes longitudinal strands 86, each of which is bent transversely midway between its ends to provide a pair of upwardly extending parallel strands 87 and a hinge member 88. The hinge members 88 are operably connected to the associated hinge members 30 by split coupling members 90, which are bent into cylindrical form around the hinge members 30 and 88, respectively. The upper ends of the parallel strands 87 extend above the back frame 68 and are then curved rearwardly and downwardly and secured at their ends in the perforations 85 of the bead 84 on the upper transverse back member 72. The upper curved portion of each strand 87 is reinforced with a wire brace 94 secured at its ends to the strand by clips 96, while the lower portion of each strand 87 is reinforced by an arched wire brace 98 secured at its forward end to the associated strand by a clip 100 and at its rear end in a perforation 85 of the bead 84 of the lower transverse end member 74.

Each pair of parallel strands 87 is reinforced by a zigzag wire 104 secured at its bent lateral portions to the strands by clips 106. The parallel strands 87 are further reinforced with resilient elements 48, which have their ends interlaced with the zigzag wires 104, respectively. If desired the strands 87 may also be reinforced with transverse wires 54.

By providing an open rectangular frame 68 for the back structure 24, as disclosed by Fig. 1, it is apparent that a greater number of seats may be arranged in a row in a vehicle of given size than with ordinary seats, as the knees may be extended into the hollow back structures 24 without inconveniencing the passengers, and the lower transverse member 74 may be used as a footrest.

Any suitable upholstery may be employed. That disclosed by Figs. 1 and 2 is in one continuous piece so that the back portion will move up and down with the seat portion and thus avoid disarrangement of occupants' clothes.

If desired the seat may be equipped with legs and arm rests, or it may be placed in an auxiliary support, not shown, provided with such equipment.

From the foregoing specification and drawings, it will be understood that I have provided a combined seat and back structure possessing the advantages above pointed out, and while I have shown and described two forms of the invention it is apparent that other forms and modifications may be made which fall within the scope of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In a seat, a back frame of open construction, longitudinal strand wires spaced in front of the frame structure and secured to the upper portion thereof, zigzag wires connecting the strand wires in pairs, and resilient elements arranged between the two strands of each of said pairs of strand wires and interlaced at their ends with the associated zigzag wires.

2. In combination, a seat structure, a back structure operably connected to said seat structure, said back and seat structures including frames of composite material, comprising tacking material and sheaths enclosing said tacking material, strands arranged in pairs extending longitudinally of said frames and secured thereto, zigzag strands arranged between the strands of said pairs of strands and extending substantially the full length thereof, respectively, resilient elements associated with said zigzag strands, and clips securing the zigzag strands to the pairs of strands between which they are arranged.

3. In combination, a seat structure comprising a frame, a superstructure carried by said frame and comprising a plurality of parallel strands arranged in pairs extending longitudinally of the frame, and a plurality of zigzag strands each

interposed between and secured to the strands of one of said pairs of parallel strands, the portions of said zigzag strands extending between the strands of said pairs of parallel strands being straight, whereby to prevent spreading of the strands of said pairs of parallel strands.

4. In combination, a seat structure comprising a frame, a superstructure carried by said frame and comprising a plurality of parallel strands arranged in pairs extending longitudinally of the frame, a zigzag strand interposed between the strands of each of said pairs of parallel strands and having laterally bent portions adjacent said parallel strands, and clips securing the laterally bent portions of each zigzag strand to the associated pair of parallel strands, the portions of said zigzag strands extending between the strands of said pairs of parallel strands being straight, whereby to prevent spreading of the strands of said pairs of parallel strands.

JOHN M. DORTON.

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